WHAT IS CLAIMED IS:

1. A method of forming a periodic structure, comprising:

irradiating a uniaxial laser beam near an ablation threshold to a surface of a material; and

executing an overlapped scanning on the irradiated region, so as to cause an ablation at a section where interference has taken place between an incident beam and a surface scattered wave generated along the material surface, and to thereby cause spontaneous formation of a periodic structure.

2. The method according to claim 1, wherein the step of irradiating the laser beam includes setting the laser scanning speed such that 10 to 300 shots of laser beam irradiation is applied to an identical position, according to a laser spot diameter and a laser oscillating frequency.

3. The method according to claim 1 or 2, wherein the step of irradiating the laser beam includes changing an incident angle of the laser beam to the material surface, to thereby change a ripple spacing of the periodic structure.

4. The method according to any of claims 1 to 3, wherein the step of irradiating the laser beam includes irradiating the laser beam at an incident angle, and the step of executing an overlapped scanning includes changing a scanning direction of the laser beam so as to change the periodic structure.

5. The method according to any of claims 1 to 4, wherein the step of irradiating the laser beam includes changing a

direction of polarization so as to change a direction of the periodic structure.

6. The method according to any of claims 1 to 5, further comprising utilizing a beam expander either with or without a cylindrical lens, thus expanding the laser beam to irradiate a more extensive area.

7. A method of surface treatment, comprising:

forming a grating structure on a surface of a material, to thereby change surface characteristics of the material.

8. The method according to claim 7, wherein the step of forming the grating structure includes irradiating a laser beam near an ablation threshold to the surface of the material; and executing an overlapped scanning on the irradiated region, to thereby cause spontaneous formation of the grating structure.

9. The method according to claim 7 or 8, wherein the step of forming the grating structure includes forming the grating structure so as to overlap in different directions.

10. The method according to claim 7 or 8, wherein the step of forming the grating structure includes disposing the grating structure in a mixed layout in different directions.

11. The method according to any of claims 7 to 9, wherein the step of forming the grating structure includes irradiating a laser beam near an ablation threshold having a plurality of pulses of a different direction of polarization to the surface of the material, such that the pulses do not overlap in time;

executing an overlapped scanning on the irradiated region, to thereby cause spontaneous formation of the grating structure so as to overlap in different directions.

12. The method according to any of claims 7, 8 or 10, wherein the step of forming the grating structure includes irradiating a laser beam near an ablation threshold to the surface of the material; and the step of executing an overlapped scanning includes changing the direction of polarization during the scanning, to thereby cause spontaneous formation of the grating structure in a mixed layout in different directions.

13. The method according to any of claims 7 to 12, further comprising utilizing a cylindrical lens to condense the laser beam, thus forming the grating structure in a more extensive area.

14. The method according to any of claims 7 to 13, wherein the grating structure is formed with a ripple spacing of 1 μm or less.

15. The method according to any of claims 7 to 14, wherein the surface characteristics include dustproofness and inhibition of particle adhesion.

16. The method according to any of claims 7 to 14, wherein the surface characteristics include reduction of friction and friction wear.

17. The method according to any of claims 7 to 14, wherein the surface characteristics include reduction of wettability.